AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently amended) A charged beam exposure for delineating patterns of systems on substrates to describe the systems in logic expressions, to convert the logic expressions into connections of standard cells, and to delineate patterns of the standard cells on the substrates, comprising:

a beam generation source generating charged beams;

Character Projection (CP) apertures having shaping holes of the charged beams having shapes of one hundred or more characters having shapes of the standard cells;

standard cell library recording means for recording a standard cell library having an information configured to design the patterns of the systems by using the standard cells having functions, shapes of outlines, and input/output positions of the standard cells, and for recording the standard cell library having first placement positions of the shaping holes on said CP apertures related to the standard cells corresponding to the shaping holes;

Character Projection (CP) aperture decision means for conducting logic synthesis for the CP apertures using only the standard cells corresponding to the shaping holes placed on first placement positions on the respective CP apertures[[,]]; for selecting one of the CP apertures for which the logic synthesis is conducted by using only the standard cells on the one of the CP apertures, which satisfies designated

constraints of the systems, and which has the highest throughput in delineating one of the patterns of the systems on the substrates by using only the standard cells on the one of the CP apertures; for conducting logic synthesis again for the respective CP apertures without a constraint on using only the standard cells on the one of the CP apertures; and for selecting one of the CP apertures, for which the logic synthesis is conducted again, and which has ~~having~~ a throughput higher than a desired throughput in delineating one of the patterns of the systems on the substrates based on the standard cell library;

placement and routing means for calculating second placement positions of the standard cells on the substrates, the standard cells corresponding to the shaping holes provided on the selected one of the CP apertures based on the standard cell library;

pattern data recording means for recording second placement positions of the standard cells on the substrates, the second placement positions associated with the standard cells corresponding to the first placement positions on the selected one of the CP apertures;

a character select deflector irradiating the charged beams onto the shaping holes at the first placement positions on the selected one of the CP apertures; and

an objective deflector irradiating the charged beams onto the second placement positions on the substrates.

2. (Previously presented) The exposure as in claim 1, further comprising:

a first shaping aperture rectangularly shaping an irradiation pattern of one of the charged beams to said CP aperture.

3. (Previously presented) The exposure as in claim 1, further comprising:

a demagnifying lens demagnifying the irradiation pattern of one of the charged beams on the substrate.

4. (Previously presented) The exposure as in claim 1, wherein said standard cell library recording means further records input and output positions of signals of the standard cells.

5. (Previously presented) The exposure as in claim 1, wherein one of the CP apertures further has an opening for a variable shaped beam (VSB).

6. (Previously presented) The exposure as claimed in claim 1, wherein

the shaping holes have a shape of one of the standards cell having a higher frequency of use or a shape of one of the standard cells corresponding to reducing a number of shots by CP exposure.

7. (Currently amended) An exposure pattern data generation apparatus for delineating patterns of systems on substrates to describe the systems in logic

expressions, to convert the logic expressions into connections of standard cells, and to delineate patterns of the standard cells on the substrates, comprising:

Character Projection(CP) aperture creation means for creating CP apertures having shaping holes corresponding to one hundred or more characters having shapes of the standard cells;

standard cell library recording means for recording a standard cell library having an information configured to design the patterns of the systems by using the standard cells having functions, shapes of outlines, and input/output positions of the standard cells, and for recording the standard cell library having first placement positions of the shaping holes on said CP apertures related to the standard cells corresponding to the shaping holes;

Character Projection(CP) aperture decision means for conducting logic synthesis for the CP apertures using only the standard cells corresponding to the shaping holes placed on first placement positions on the respective CP apertures[[,]]; for selecting one of the CP apertures for which the logic synthesis is conducted by using only the standard cells on the one of the CP apertures, which satisfies designated constraints of the systems, and which has the highest throughput in delineating one of the patterns of the systems on the substrates by using only the standard cells on the one of the CP apertures; for conducting logic synthesis again for the respective CP apertures without a constraint on using only the standard cells on the one of the CP apertures; and for selecting one of the CP apertures, for which the logic synthesis is conducted again, and

which has ~~having~~ a throughput higher than a desired throughput in delineating one of the patterns of the systems on the substrates based on the standard cell library;

placement and routing means for calculating second placement positions of the standard cells on the substrates, the standard cells corresponding to the shaping holes provided on the selected one of the CP apertures based on the standard cell library; and

pattern data recording means for recording second placement positions of the standard cells on the substrates, the second placement positions associated with the standard cells corresponding to the first placement positions on the selected one of the CP apertures.

8. (Previously presented) The apparatus as in claim 7, further comprising:

variable shaped beam (VSB) exposure data conversion means for converting data into data capable of being used by an exposure to conduct VSB exposure to the standard cells which cannot be subject to exposure using the shaping holes.

9. (Previously presented) The apparatus as in claim 7, wherein

said CP aperture decision means comprises:

standard cell extraction means for extracting the standard cells;

logic synthesis means for conducting synthesized logic using the extracted standard cells; and

constraints and a like determination means for determining whether the logic synthesis satisfies a specification.

10. (Previously presented) The apparatus as in claim 9, wherein said CP aperture decision means further comprises:

CP aperture creation means for creating a new CP aperture if the CP apertures cannot satisfy the specification.

11. (Previously presented) The apparatus as in claim 7, wherein said placement and routing means calculates wiring routes among the placed standard cells.

12. (Previously presented) The apparatus as in claim 7, further comprising:

first standard cell library recording means for recording magnitudes, functions and performances of the standard cells, an identification code of one of the CP apertures on which the shaping holes having the shapes of the standard cells are formed and the first placement positions, and for providing the recorded magnitudes, functions and performances of the standard cells, the identification code and the first placement positions to said CP aperture decision means.

13. (Previously presented) The apparatus as in claim 7, further comprising:

second standard cell library recording means for recording shapes and magnitudes of outlines of the standard cells, positions of input and output signals, an identification code of one of the CP apertures on which the shaping holes having the shapes of the standard cells are formed and the first placement positions, and for providing the recorded shapes and magnitudes of the outlines of the standard cells, positions of the input and output signals, identification code and the first placement positions to said placement and routing means.

14. (Previously presented) The apparatus as in claim 13, further comprising:

pattern data recording means for recording the second placement positions, the identification code and wiring routes among the standard cells provided from said placement and routing means.

15. (Currently amended) An exposure pattern data generation method for delineating patterns of systems on substrates to describe the systems in logic expressions, to convert the logic expressions into connections of standard cells, and to delineate patterns of the standard cells on the substrates, comprising:

creating Character Projection (CP) apertures having shaping holes corresponding to one hundred or more characters having shapes of the standard cells;

recording a standard cell library having an information configured to design the patterns of the systems by using the standard cells having functions, shapes of outlines,

and input/output positions of the standard cells, and recording the standard cell library having first placement positions of the shaping holes on said CP apertures related to the standard cells corresponding to the shaping holes;

conducting logic synthesis for the Character Projection (CP) apertures using only the standard cells corresponding to the shaping holes placed at first placement positions on the respective CP apertures on the substrate based on the standard cell library;

selecting one of the CP apertures for which the logic synthesis is conducted by using only the standard cells on the one of the CP apertures, which satisfies designated constraints of the systems, and which has the highest throughput in delineating one of the patterns of the systems on the substrates by using only the standard cells on the one of the CP apertures;

conducting logic synthesis again for the respective CP apertures without a constraint on using only the standard cells on the one of the CP apertures;

selecting one of the CP apertures, for which the logic synthesis is conducted again, and which has ~~having~~ a throughput higher than a desired throughput in delineating one of the patterns of the systems on the substrates from the CP apertures on the substrates based on the standard cell library;

calculating second placement positions of the standard cells on the substrates, the standard cells corresponding to the shaping holes provided on the selected one of the CP apertures on the substrates based on the standard cell library; and

recording second placement positions of the standard cells on the substrates, the second placement positions associated with the standard cells corresponding to the first placement positions on one of the selected CP apertures.

16. (Previously presented) The method as in claim 15, further comprising:

converting data into data capable of being used by an exposure to conduct variable shaped beam (VSB) exposure to the standard cells which cannot be subjected to exposure using the shaping holes.

17. (Previously presented) The method as in claim 15, wherein

said conducting logic synthesis for CP apertures using standard cells corresponding to shaping holes placed at first placement positions on the respective CP apertures comprises:

extracting the standard cells; and

conducting logic synthesis using the extracted standard cells, and

said selecting a CP aperture used for exposure from the CP apertures comprises:

determining whether the synthesized logic satisfies a specification.

18. (Previously presented) The method as in claim 15, wherein

said conducting logic synthesis for CP apertures using standard cells corresponding to shaping holes placed at first placement positions on the respective CP apertures further comprises:

creating a new CP aperture if the CP apertures cannot satisfy the specification.

19. (Previously presented) The method as in claim 15, wherein

the calculating second placement positions of the standard cells on a substrate, the standard cells corresponding to the shaping holes provided on the selected CP aperture further comprises:

calculating wiring routes among the placed standard cells.

20. (Previously presented) The method as in claim 15, further comprising:

recording magnitudes, functions, outline shapes and outline magnitudes of the standard cells, positions of input and output signals, identification codes of the CP apertures on which the shaping holes having the shapes of the standard cells are formed and the first placement positions.

21. (Previously presented) The method as in claim 15, further comprising:

recording the second placement positions, identification codes and wiring routes among the standard cells.

22. (Previously presented) The exposure as in claim 1, wherein

the standard cells on the CP apertures are listed in an order of a frequency of using each of the standard cells used by the systems, and

in an order according to a difference between a variable shaped beam (VSB) shot number, defined as a number of exposures of a one of the standard cells with VSB exposure, and a CP shot number, defined as a number of exposures of the one of the standard cells with CP exposure.

23. (Previously presented) The exposure as in claim 1, wherein said CP aperture decision means further comprises:

a CP aperture creation means for listing the standard cells in an order of frequency of use of each of the standard cells used by the systems, and in an order according to a difference between a variable shaped beam (VSB) shot number, defined as a number of exposures of a one of the standard cells with VSB exposure, and a CP shot number, defined as a number of exposures of the one of the standard cells with CP exposure; and

means for creating a new CP aperture based on the listed standard cells if the CP apertures cannot satisfy the desired throughput.

24. (Previously presented) The exposure as in claim 1, wherein

the systems are logic products, and

the standard cells have shapes of the characters having shapes corresponding to the shaping holes are circuits having functions making logic expressions for logic synthesis.

25. (Previously presented) The exposure as in claim 1, wherein

the standard cells on the CP apertures are listed in effective order of CP effectiveness defined as a quotient of a product divided by a CP shot number defined as a number of exposures of the one of the standard cells with CP exposure, the product being a result of multiplying a frequency of use of each of the standard cells used by the systems by a difference between a number of variable shaped beam (VSB) shots, defined as a number of exposures of a one of the standard cells with VSB exposure, and the CP shot number.

26. (Previously presented) The exposure as in claim 1, further comprising:

variable shaped beam (VSB) exposure data conversion means for converting data into data capable of being used for an exposure to conduct VSB exposure of the standard cells which cannot be subjected to exposure using the shaping holes.

27. (Previously presented) The apparatus as in claim 7, wherein

the standard cells on the CP apertures are listed in an order of a frequency of using each of the standard cells used by the systems, and

in an order according to a difference between a variable shaped beam (VSB) shot number, defined as a number of exposures of a one of the standard cells with VSB exposure, and a CP shot number, defined as a number of exposures of the one of the standard cells with CP exposure.

28. (Previously presented) The apparatus as in claim 7, wherein

the systems are logic products, and

the standard cells have shapes of the characters having shapes corresponding to the shaping holes are circuits having functions making logic expressions for logic synthesis.

29. (Previously presented) The apparatus as in claim 7, wherein:

the standard cells on the CP apertures are listed in effective order of CP effectiveness defined as a quotient of a product divided by a CP shot number defined as a number of exposures of the one of the standard cells with CP exposure, the product being a result of multiplying a frequency of use of each of the standard cells used by the systems by a difference between a number of variable shaped beam (VSB) shots, defined as a number of exposures of a one of the standard cells with VSB exposure, and the CP shot number.

30. (Previously presented) The method as in claim 15, further including:

listing the standard cells on the CP apertures in an order of a frequency of using each of the standard cells used by the systems; and

listing the standard cells according to a difference between a variable shaped beam (VSB) shot number, defined as a number of exposures of a one of the standard cells with VSB exposure, and a CP shot number, defined as a number of exposures of the one of the standard cells with CP exposure.

31. (Previously presented) The method as in claim 15, wherein said selecting further comprises:

listing the standard cells in order of frequency of use of each of the standard cells used by the systems;

listing the standard cells according to a difference between a variable shaped beam (VSB) shot number, defined as a number of exposures a one of the standard cells with VSB exposure, and a CP shot number, defined as a number of exposures of the one of the standard cells with CP exposure; and

creating a new CP aperture based on the listed standard cells if the CP apertures cannot satisfy the desired throughput.

32. (Previously presented) The method as in claim 15, wherein the systems are logic products, and the standard cells have shapes of the characters having shapes

corresponding to the shaping holes are circuits having functions, the method further including:

making logic expressions for logic synthesis using the standard cells.

33. (Previously presented) The method as in claim 15, further comprising:

listing the standard cells on the CP apertures in effective order of CP effectiveness defined as a quotient of a product divided by a CP shot number defined as a number of exposures of the one of the standard cells with CP exposure, the product being a result of multiplying a frequency of use of each of the standard cells used by the systems by a difference between a number of variable shaped beam (VSB) shots, defined as a number of exposures of a one of the standard cells with VSB exposure, and the CP shot number.

34. (Previously presented) The exposure as in claim 4, wherein

the logic products are at least one of application specific ICs and system LSIs, and

the standard cells having shapes of the characters having shapes corresponding to the shaping holes are at least one of an AND circuit, a flip-flop circuit, and an inverter.